

WORLDWIDE EMERGING ENVIRONMENTAL ISSUES AFFECTING THE U.S. MILITARY
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Note to Readers: Pages 1-15 comprise the summary and analysis of this report. Expanded details for some items are in the Appendix beginning on page 16.

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Item 1. Environmental Damage to Be Criminalized in the EU

The Permanent Representatives Committee approved the proposal on the protection of the environment through criminal law. EU national governments will have to apply criminal sanctions to those causing “deliberate or negligent damage to the environment.” The list of punishable crimes will include: unlawful discharge of pollutants which could cause “death or serious injury to any person” or “substantial damage” to the environment; illegal waste shipment; killing or possession of protected fauna or flora; significant deterioration of habitats within protected sites; and any action related to ozone-depleting substances. The penalties are left to the discretion of member states as long as they are “effective, proportionate and dissuasive.” The Directive is pending final approval by the Parliament and the EU Council, and is expected to enter into force in 2010. [See also *Environmental Crime Could Become a Felony in the EU* in February 2007 environmental security report.]

Military Implications:

The Directive does not contain an exception clause for the military. Military organizations stationed in the EU countries should assess the impact of the Directive on their operations and in relation to existing Status of Forces Agreements (SOFAs) and other agreements, and as to whether or how it would affect its service members’, contractors’ and dependents’ activities.

Sources:

Protection of the environment through criminal law

http://www.consilium.europa.eu/uedocs/cms_Data/docs/pressdata/en/misc/100525.pdf

EU criminal law to protect the environment

http://www.europarl.europa.eu/news/expert/infopress_page/064-29450-140-05-21-911-20080520IPR29449-19-05-2008-2008-false/default_en.htm

EU agrees to outlaw ‘green’ crimes

<http://www.wbcsd.org/plugins/DocSearch/details.asp?type=DocDet&ObjectId=MzAxNTU>

Item 2. New International Financial Alliance to Support Biodiversity

Representatives of 191 Parties to the Convention on Biological Diversity and over 100 ministers met in Bonn to improve the set of rules that help protect biodiversity. Plant and animal species are being lost at a rate between 100 and 1000 times the natural extinction rates. One of the results of the meeting was the establishment of Life Web as a financing mechanism for protected areas. So far, more than 60 Parties have made financial pledges. For example, German Chancellor Angela Merkel pledged 500 million Euros for forest protection up to 2012 and 500 million Euros a year after that.

Military Implications:

Relevant military personnel should follow the decisions of this alliance to anticipate impacts on international bases and training areas and for planning responses.

Sources:

A new universal global alliance for biodiversity protection established in Bonn

<http://www.cbd.int/doc/press/2008/pr-2008-05-30-cop9-en.pdf>

Item 3. US-Uruguay Treaty on S&T Cooperation

On April 29th the US and Uruguay signed a treaty to increase government, academic, business, and NGO scientific cooperation between the two countries. The agreement gives special attention to the study of biodiversity to improve agriculture, medicine, and understanding of the impact of climate change on the environment.

Military Implications:

The agreement should be reviewed for military-to-military assistance and training opportunities to support environmental research that could reduce the military environmental footprint, and for other environmental security considerations.

Source:

The United States and Uruguay Sign a Science and Technology Cooperation Agreement
<http://www.state.gov/r/pa/prs/ps/2008/apr/104151.htm>

Item 4. International Convention on Cluster Munitions Adopted by 111 Countries

The Convention on Cluster Munitions was formally adopted by 111 countries in Dublin, Ireland, on May 30, 2008. The Convention is a legally binding instrument that outlaws the use, production, transfer, and stockpiling of cluster munitions, and commits countries to clear areas contaminated by cluster munitions and assist victims and affected communities. The President of the International Committee of the Red Cross, Jakob Kellenberger, urged all countries to adhere to the Convention and noted “these weapons are not only morally unacceptable but also now illegal under international humanitarian law.” The Cluster Munitions Convention will be opened for signature in Oslo, December 2-3, 2008, and will enter into force after 30 ratifications. The U.S., China, and Russia did not participate in the meeting. [See also *Negotiations Continue for an International Instrument to Ban Cluster Munitions* in November 2007 and other related items in previous environmental security reports.]

Military Implications:

Although the U.S. does not support the Cluster Munitions Convention, it would be wise for the military to make plans for the elimination of cluster bombs, as international opinion continues to grow against these weapons, possibly resulting in changed policy during the next administration.

Sources: (see a more expanded list in the [Appendix](#))

Dublin Diplomatic Conference, May 19-30, 2008

<http://www.clustermunitionsdublin.ie/>

Cluster Munitions: Convention a major step forward for the protection of civilians

<http://www.icrc.org/Web/Eng/siteeng0.nsf/html/cluster-munitions-news-290508>

Item 5. Indigenous Peoples Demand More Involvement in Environmental Policies

Climate change was the special focus of the UN Permanent Forum on Indigenous Issues, held in New York, April 21-May 2, 2008. The approximately 3,300 delegates representing the 370 million indigenous people from around the world stressed that indigenous peoples should be

included in the international debate on climate change. The Forum suggested that a working group on local adaptation measures and traditional knowledge of indigenous peoples be established, since they can provide important insights for designing and implementing sustainable mitigation and adaptation strategies.

Military Implications:

The military, in cooperation with aid and environmental organizations, should work with indigenous peoples to develop sustainable mitigation and adaptation strategies, especially in communities prone to natural disasters and climate change effects. Indigenous people may request new regulations for more restricted and protected areas and/or restraint of specific environmentally damaging actions. Since indigenous people see their cultures increasingly threatened, the military, working with governments, should assess the “hot spots” and try to mitigate potential social unrest.

Sources: (see a more expanded list in the [Appendix](#))

Seventh Session of the United Nations Permanent Forum on Indigenous Issues

http://www.un.org/esa/socdev/unpfii/en/session_seventh.html

World's Native Peoples Take on Climate Change

<http://www.loe.org/shows/segments.htm?programID=08-P13-00019&segmentID=4>

Indigenous peoples most affected by climate change, Assembly President says

<http://www.un.org/apps/news/story.asp?NewsID=26531&Cr=indigenous&Cr1=>

Item 6. First Species declared Endangered Due to Global Warming

Polar bears were declared a “threatened” species under the U.S. Endangered Species Act, becoming the first species officially designated in danger of extinction because of global warming. Environmental groups are not pleased with the new regulation, since important greenhouse gas emission-related activities, such as offshore oil and gas exploitation, are exempted from compliance with the law. [See also *Melting Glaciers and Sea Ice* in August 2007 and other similar items in previous environmental security reports.]

Military Implications:

Declaring the polar bear as a threatened species creates a precedent for new actions to address consequences of climate change. It is fair to speculate that other countries will follow suit by declaring other animals and their habitats protected. The military should determine if the new status of the polar bears affects military activities in pertinent regions.

Sources:

Polar bear is listed as threatened species

<http://www.latimes.com/news/nationworld/nation/la-me-polar15-2008may15,0,3225200.story?page=2>

Polar Bear Added to List of Threatened Species in U.S.

<http://www.voanews.com/english/Science/2008-05-16-voa27.cfm>

U.S. lists polar bears as threatened species

<http://www.cbc.ca/world/story/2008/05/14/polar-bear.html>

Item 7. Technological Advances with Environmental Security Implications

7.1 New Detection and Cleanup Techniques

7.1.1 Nanotube-based Biosensor Sensitive to Trace Amounts

Early Warning Inc. of Troy NY has licensed from NASA's Moffett Field Ames Research Center technology for a nanotube-based biosensor sensitive to trace amounts of specific bacteria, viruses and parasites. According to a company release, "The biosensor works when a single strand of nucleic acid comes into contact with a matching strand of nucleic acid attached to the end of an ultra-conductive nanotube. The matching strands form a double helix that generates an electrical signal, which is used to determine the presence of specific microorganisms in the sample. Because of their tiny size, millions of nanotubes can fit on a single biosensor chip allowing identification of very low levels."

Military Implications:

The military should investigate this product for its usefulness in testing possibly contaminated environments.

Sources:

NASA Nanotechnology-Based Biosensor Helps Detect Biohazards

http://www.nasa.gov/centers/ames/news/releases/2008/08_45AR.html

Early Warning (the company)

<http://www.earlywarninginc.com/early-warning-profile.php>

7.1.2 Emerging Contaminants: Most Effective Treatment Strategies

Endocrine disruptor chemicals (EDCs) and pharmaceuticals and personal care products (PPCPs) have been discussed as emerging issues for water supply and wildlife protection for more than a decade. The American Water Works Association's (AWWA) May 2008 Opflow carries an article describing three processes for treating these substances in public water supplies. Additionally, AWWA has added a special session to its June 8-12, 2008 annual conference in Atlanta, Georgia. Taken together, these indicate that public and water industry interest in remedial action has run ahead of legislation and regulation – leaping over at least one of the common four steps through which an issue progresses in evolving from a scientific discovery to become a societal action item. The three processes discussed in the article are: additional processing of wastewater effluents, reverse osmosis treatment of potable water, and combined ultraviolet/reverse osmosis treatment of potable water.

Military Implications:

Military utility managers and water supply contractors, as well as preventive health authorities should follow developments on this topic in order to respond to any new regulatory and operational requirements that might arise.

Sources:

Oppenheimer, J., R. Stephenson, and J. Decarolis, Emerging contaminants: Insights to the most effective EDC and PPCP treatment strategies, AWWA Opflow, May 2008, pp. 12-16.

Conference session added to address microconstituents

<http://www.awwa.org/publications/MainStreamArticle.cfm?itemnumber=35946>

7.2 Technologies for Increasing Energy Efficiency

7.2.1 New Lithium-ion Battery Offers Multiple Advantages

A123 Systems of Watertown MA developed a new lithium-ion battery design with significant advantages for demanding mobile applications, such as electric vehicles and portable electronic devices. The new units feature greatly increased safety (not bursting and igniting, when overheated or damaged), longer life, and greater energy capacity, stemming from an innovative electrode material that contains nanoparticles of lithium iron phosphate modified with trace metals.

Military Implications:

The military should investigate the use of this battery design, both to reduce the environmental footprint of military vehicles and in power supplies for portable and mobile environmental monitoring systems.

Sources:

An Electrifying Startup. A new lithium-ion battery from A123 Systems could help electric cars and hybrids come to dominate the roads (note: requires free registration to access article)
http://www.technologyreview.com/read_article.aspx?ch=specialsections&sc=batteries&id=20570&a=

7.2.2 Improved Solar Cell Promised in a Year

SUNRGI Company announced the development of a solar cell technology which they say will deliver power at 7¢/kWh, around the price of coal-fired energy. Their panels use lenses to concentrate sunlight, and a proprietary cooling system to prevent consequent cell damage from heating. Start of production is scheduled for mid-2009. IBM has also released details on a similar technique.

Military Implications:

The military should follow the development of these improved power sources for their possible use in environmental surveillance systems and other military applications.

Sources:

Start-up: Affordable solar power possible in a year

http://www.usatoday.com/money/industries/energy/environment/2008-04-28-solar-power-sunrgi_N.htm

SUNRGI Company: <http://www.sunrgi.com>

IBM today announced a research breakthrough in photovoltaics technology that could significantly reduce the cost of harnessing the Sun's power for electricity

<http://physorg.com/news130086323.html>

7.2.3 New Inter-electrode Material Yields 50% Fuel Cell Power Increase

MIT Professor Paula T. Hammond and her team produced a new thin film material for the membrane separating the electrodes in direct methanol fuel cells. The current material is not impervious to methanol leakage across the boundary. Applying the new film produced a 50% gain in power output from the cell. Drexel University chemical engineering professor Yossef Elabd had earlier investigated the leakage mechanism in the present membranes, and produced several other alternatives.

Military Implications:

The military should follow this development as it carries on into commercial application in power supplies for a variety of purposes, including environmental equipment.

Sources:

More-Powerful Fuel Cells

<http://www.technologyreview.com/Energy/20813/page1/>

MIT Creates New Material For Fuel Cells, Increases Power Output By 50 Percent

<http://www.physorg.com/news130078922.html>

Chemical Engineer Discovers Way of Increasing Battery Life with Environmentally Friendly Fuel Cells

<http://www.physorg.com/news126194529.html>

7.2.4 Formic Acid Provides New Fuel Cell Medium

Matthias Beller and colleagues at the Leibniz Institute for Catalysis, in Rostock, Germany have developed a technique to convert formic acid into hydrogen at low temperatures (26°C to 40°C). The new process is suitable for low-power fuel cell applications, like mobile electronic devices, rather than for vehicle usage. It does not require a high-temperature steam reforming unit, as methanol does (instead, it is converted to hydrogen by a ruthenium-based catalyst) and its power/weight ratio is only one-third that of methanol.

Military Implications:

The military should follow this development for its applicability to power supplies for military systems and mobile environmental monitoring devices.

Source:

Hydrogen Fuel from Formic Acid

<http://www.technologyreview.com/Energy/20778/?a=f>

7.2.5 New Insight into Methane-converting Catalyst

New work reported by the International Consortium for Clean Energy, a collaboration among DOE's Pacific Northwest National Laboratory, the Chinese Academy of Sciences' Dalian Institute of Chemical Physics, and China's Institute of Coal Chemistry, sheds light on the optimum structure for a catalytic material, molybdenum oxide on a zeolite substrate, which can turn methane into benzene.

Military Implications:

Although R&D remains to be done to exploit this new information, the military should establish and maintain contact with the work in order to be able to apply it to the reclamation of methane from sewage treatment plants and solid waste landfills that would otherwise pollute the environment.

Source:

Halting methane squanderlust

<http://www.physorg.com/news130592381.html>

Item 8. Updates on Previously Identified Issues

8.1 Non-Proliferation Treaty Deadlock Continues

The second of three sessions of the Preparatory Committee for the 2010 Review Conference of the Parties to the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) was held from April 28 to May 9 at the UN Office at Geneva, Switzerland. Participation included delegates of 106 States parties, representatives of specialized international organizations, and of 64 NGOs. The main issues discussed included: nuclear non-proliferation, disarmament and international security; nuclear-weapon-free zones; nuclear safeguards; the peaceful use of nuclear energy; and the Middle East situation. No special agreements were reached. The third session will be held May 4-15, 2009, and the Review Conference will be April 26–May 21, 2010, both in New York. [See also *Nuclear Nonproliferation Treaty Stalemate Continues* in May 2007, *Review Conference of the Non-Proliferation Treaty* in May 2005, and other related items in previous environmental security reports.]

Military Implications:

[Same as previous on this issue] The military should seek alternative means that might be more effective in working with the appropriate agencies to facilitate the NPT negotiations to improve global nuclear safety than is now the case.

Sources:

PREPCOM 2008, 2010 NPT Review

<http://www.un.org/NPT2010/SecondSession>

Nuclear States Joint Statement

<http://www.reachingcriticalwill.org/legal/npt/prepcom08/statements/May09Statement%20by%20P5.pdf>

Geneva Talks Pave Way to 2010 NPT Review

<http://www.iaea.org/NewsCenter/News/2008/genevataalks.html>

NPT Meeting Wraps Up in Geneva

http://www.nti.org/d_newswire/issues/2008_5_9.html#8360B7DE

8.2 European Parliament Passed Resolution Calling for Global Ban of DU Weapons

The European Parliament agreed, with 491 out of 521 votes, to accept a resolution calling on the EU to lead negotiations “through the UN or through a ‘coalition of the willing’” for a global treaty to ban depleted uranium weapons. The resolution “Strongly reiterates its call on all Member States and NATO countries to impose a moratorium on the use of depleted uranium weapons and to redouble efforts towards a global ban, as well as systematically to halt production and procurement of this type of weaponry.” It also recommends inclusion of this wording in the European Security Strategy, “the need to give serious thought to the future utility of unguided munitions, as well as cluster bombs, mines and other weapons of indiscriminate effect, such as depleted uranium weapons;” and “not to deploy military and civilian personnel in regions where no guarantee can be given to the effect that depleted uranium has not been, or will not be, used.” [See also *Depleted Uranium Environmental Concerns Resurfacing* in November 2007 and other items on this issue in previous environmental security reports.]

Military Implications:

The military should continue pursuing R&D for substitutes and be prepared for increased political pressure for current and past battlefield cleanup.

Sources:

European Parliament passes far reaching DU resolution in landslide vote

<http://www.bandepleteduranium.org/en/a/181.html>

Protection of the environment through criminal law

http://www.consilium.europa.eu/uedocs/cms_Data/docs/pressdata/en/misc/100525.pdf

8.3 New Mechanisms for Enforcing Biosafety and Biological Diversity Treaties

The focus of the fourth Meeting of the Parties to the Cartagena Protocol on Biosafety (COP/MOP 4), held from 12-16 May 2008 in Bonn, Germany, was on enforcement measures. It adopted 18 decisions on issues related to: the Biosafety Clearing-House; identification and handling of living modified organisms; notification requirements; risk assessment and risk management; and monitoring and reporting. The timetable and framework were set for a liability and redress regime concerning potential damage caused by the movements of genetically modified organisms, which will be further discussed at the next meeting of the parties to take place in October 2010, in Nagoya, Japan. An ad hoc technical expert group was mandated to consider risk assessment and risk management issues. The *Rules, Procedures and Mechanisms Applicable to Processes under the Cartagena Protocol on Biosafety* was also published at this meeting.

The Ninth Meeting of the Parties to the Convention on Biological Diversity followed, May 19-30, 2008, also in Bonn, Germany, assessing mechanisms to reduce loss of biodiversity. The CBD COP 9 adopted the “Bonn roadmap” that addresses issues concerning an international regime on access and benefit-sharing; a mechanism for assessing marine areas in need of protection; a resolution on biodiversity and climate change, including language cautioning against ocean fertilization; and an agreement on biofuels. [See also *International Biodiversity Meetings Make Decisions and Tougher Systems to Control GMO Suggested* in March 2006 environmental security report.]

Military Implications:

[Same as previous on similar issues] The military should note the outcomes of the two meetings and be prepared to comply with the new requirements, including genetically modified organism (GMO) labeling of food containers it brings into Protocol member countries and new measures for protecting biodiversity.

Sources:

Fourth meeting of the Parties to the Cartagena Protocol on Biosafety (COP-MOP 4)

<http://www.cbd.int/mop4/>

Agreement Reached to Work towards a Legally Binding Instrument on Liability and Redress with Regard to GMOs

<http://www.cbd.int/doc/press/2008/pr-2008-05-16-mop4-en.pdf>

Rules, Procedures and Mechanisms Applicable to Processes under the Cartagena Protocol on Biosafety

<http://www.cbd.int/doc/publications/bs-rules-en.pdf>

Loss of Animal Species and Crops Is ‘Devastating’ - Secretary-General Ban

<http://www.un.org/apps/news/story.asp?NewsID=26756&Cr=biodiversity&Cr1=>

Ninth Meeting of the Conference of the Parties to the Convention on Biological Diversity

<http://www.iisd.ca/biodiv/cop9>

8.4 IMO Sets New Limits on Ship Fuel Pollution

The International Maritime Organization has agreed on severe new limits on ship fuel pollutants, especially sulphur (sulfur). The restrictions are to be implemented by 2015, and will impose a change in sulphur limits in special Sulphur Emission Control Areas (SECA) to 0.1% from the current 1.5%. The set of SECAs, now including only Baltic and North Sea areas, is likely to be expanded to other coastal regions in the world.

Military Implications:

The military must take these tightening requirements on maritime fuel composition into account in planning future fuel and vessel acquisitions.

Source:

Short sea shipping at risk from IMO sulphur laws

<http://lloydslist.com/ll/news/short-sea-shipping-at-risk-from-imo-sulphur-laws/20017521753.htm>

IMO environment meeting to consider revised regulations on ship emissions

<http://www.imo.org/>

U.N. body to slash ship fuel pollution by 2015

<http://www.reuters.com/article/environmentNews/idUSL0487267520080404>

8.5 EU Airline Carbon Trading to Start in 2011—a Year Earlier than Planned

The European Parliament's Environment Committee voted to include aviation in Europe's emissions trading scheme from 2011—a year earlier than planned. Airlines should bid for at least 25% of pollution permits. Members of the European Parliament want to set CO₂ emissions cap at 90% of the levels between 2004 and 2006 rather than 100%, with the cap lowered in subsequent years from 2013. [See also *New European Environmental Regulations* in December 2007 and *Europe to Propose Emissions Targets for All Flights to/from or within Europe* in November 2006 environmental security reports.]

Military Implications:

[Same as previous on similar issues] It is not clear at this point if the proposed EU regulation concerns just commercial and private flights, or all. The military should explore impacts on its European operations and consult with allied military forces on the status of military exemptions.

Sources:

EU backs early start for airline carbon trading

<http://www.guardian.co.uk/environment/2008/may/28/travelandtransport.greenpolitics>

8.6 Arctic Issues Still at the Debate Stage

Officials from the Arctic coastal countries Canada, U.S., Russia, Denmark, and Norway met in Ilulissat, Greenland, May 27-29, 2008, to address issues related to the Arctic territory. The meeting concluded with The Ilulissat Declaration, by which the five nations reaffirm their commitment for applying the UN Law of the Sea “to the orderly settlement of any possible overlapping claims,” stipulating that there is “no need to develop a new comprehensive international legal regime to govern the Arctic Ocean.” Critics say that this opens the possibility for a polar “carve up” by the five countries. Other Arctic Council group nations (Sweden, Iceland and Finland) as well as the indigenous communities—who are the majority of the population within the Arctic Circle—were not invited to the meeting. Environmentalists and the indigenous groups call for an international treaty similar to the one for Antarctica, which bans all

military activity and mineral exploitation. A UN panel is supposed to rule on Arctic control by 2020. By the Ilulissat Declaration, the Arctic coastal nations also agree to cooperate on scientific research, improving navigation safety, and development of environmental monitoring and disaster response systems. [See also *Arctic Disputes Continue* in March 2008 and other similar items in previous environmental security reports.]

However, there is speculation that Russia has the strongest position for increasing its influence in the region and support for its expansion claims. It has infrastructure along the North Sea Route (including ports), has for a long time performed extensive research and possesses essential knowledge about the region. Most of all, Russia has the most powerful fleet and military potential permanently deployed in the Arctic. Russia is also working on gathering more evidence to support its claim for territorial expansion under the Law of the Sea.

Military Implications:

[Similar to previous on the same issue] It is likely that discussions for clear international regulations concerning the Arctic region will increase rapidly, opening the potential for new military roles in that region to ensure the safety of individuals and ecosystems. Relevant military personnel should cooperate with their counterparts in other countries and international organizations in developing timely, adequate national and international regulations and enforcement procedures.

Sources: (see a more expanded list in the [Appendix](#))

The Ilulissat Declaration. Arctic Ocean Conference Ilulissat, Greenland, 27 – 29 May 2008

<http://www.um.dk/NR/rdonlyres/BE00B850-D278-4489-A6BE-6AE230415546/0/ArcticOceanConference.pdf>

Arctic declaration denounced as territorial 'carve up'

<http://www.guardian.co.uk/environment/2008/may/29/fossilfuels.poles>

Reaching out in the Arctic

<http://en.rian.ru/analysis/20080514/107378393.html>

8.7 Canada Prepares to Ban More Chemicals

The government of Canada announced that it is preparing to issue a ban on a number of chemicals in common use in various applications, because of possible harm to human health or the environment. The 11 chemicals include vinyl acetate, ethylene oxide, thiourea, isoprene, and cyclohexasiloxanes. Industry has 60 days to offer countervailing evidence. [See also *Questions on Bisphenol A Risk Raised Again* in April 2008 environmental security report.]

Military Implications:

In anticipation of the possibility of similar action being taken internationally or in other jurisdictions, the military should review the Canadian proposal, and military usage of these materials to see if steps need to be taken to prepare for their replacement.

Source:

Ottawa prepared to slap toxic label on widely used chemicals

<http://www.canada.com/topics/news/national/story.html?id=b0eeb176-6b3d-4a3e-bb18-29033eb044cc>

8.8 Reactive Nitrogen Beginning To Be Recognized As Environmental Hazard

Two papers in the May 16 issue of *Science* discuss the problem of excessive reactive nitrogen in the environment. According to Univ. of Virginia environmental sciences professor James Galloway, “We are accumulating reactive nitrogen in the environment at alarming rates, and this

may prove to be as serious as putting carbon dioxide in the atmosphere.” Atmospheric nitrogen can appear as nitric acid in water and vegetation or can contribute to the greenhouse effect. The International Nitrogen Initiative ((www.initrogen.org)) has been established to serve as a center for efforts to cope with this problem. [See also *New Predictions for the Atmosphere by 2030* in October 2006 environmental security report.]

Military Implications:

The military environmental community should ensure that this problem is receiving adequate attention, and should participate in the Initiative.

Source:

Addressing the 'nitrogen cascade'

<http://www.physorg.com/news130081079.html>

8.9 Climate Change

A summary of some of the noteworthy news from this month follows, with more detailed descriptions of each in the [Appendix](#).

8.9.1 Scientific Evidence

A comprehensive study found conclusive evidence of the link between human-caused climate change and the trends of change of Earth's natural systems, by analyzing a database of more than 29,000 data series with at least 20 years of records between 1970 and 2004. The European Project for Ice Coring in Antarctica, found that “today's concentrations of carbon dioxide and methane are 28% and 124% higher respectively than at any time during the last 800,000 years,” increasing the likelihood that human activity is a cause of climate change. Chinese and Australian scientists are examining possibilities for deeper drilling in parts of Antarctica to find atmospheric records dating back 1.5 million years. The Living Planet Index reveals dramatic biodiversity reduction since 1970: land species have declined by 25%, marine life by 28%, and freshwater species by 29%. The tundra is shrinking with consequences that further increase greenhouse gas emissions.

8.9.2 Natural Disasters

Professor Kerry Emanuel, an MIT meteorologist, says that the power of tropical cyclones has roughly doubled since the 1950s, with most of the increase occurring over the last three decades. 2008 might be the year with the most tornadoes in the U.S. since 1950—when modern recordkeeping began. The aggravation of the Myanmar (Burma) cyclone tragedy by the ban of foreign aid agencies' intervention brings up the question of when human rights are more important than sovereignty.

8.9.3 Food and Water Security

As the food crisis intensifies around the world over the past few months, an additional 100 million people are suffering from hunger and there were food riots in some 30 countries, including recently conflict-torn countries such as Haiti, Côte d'Ivoire, Senegal, and Somalia. UN Secretary-General Ban Ki-moon announced a new international UN Task Force on the Global Food Crisis, to prepare a comprehensive plan of action to tackle food prices' rise. A few agricultural biotechnology companies are trying to concentrate corporate power and gain a

monopoly over a large part of global food, in some cases undermining agricultural productivity and jeopardizing national food security. Global warming is most probably the cause of changing rainfall patterns in Australia and the South-east Australian water system will most likely be increasingly stressed in the future.

8.9.4 Melting Glaciers and Sea Ice

Arctic sea ice has declined by about 10% in the past decade and there is a 59% chance that this year in September the ice cover will reach a new record low. Computer models that analyzed natural and human-caused variables revealed an ice-free Arctic by 2030—about two decades ahead of the predictions in the UNIPCC reports.

8.9.5 Rising Sea Levels

Six of the 18 inhabited low-lying Australian Torres islands are in danger of being swallowed by the sea and are already suffering because of abnormally high tides, land erosion, shifting seasons, and increasingly scarce marine life. Their roughly 7,000 people are unhappy with the lack of attention and care on the part of the Australian government. The Ocean Surface Topography Mission (OSTM)/Jason 2 mission to be launched in June will provide data for better understanding ocean currents and the rises in sea levels. Current marine measurements show that sea levels have risen on average by 0.3 centimeters since 1993, twice as much as in the whole 20th century.

8.9.6 Computer Modeling

Climate scientists and modelers warn that climate change forecasting abilities are still relatively weak and that some of those considered in policymaking—such as the IPCC assessments — are highly debatable, being too conservative and not taking into account the latest research. At the World Modelling Summit for Climate Prediction climate scientists called for major new modeling capabilities and made the case for a climate-prediction project on the scale of the Human Genome Project. A key component would be a world climate research facility.

8.9.7 Post-Kyoto Negotiations

Scientists at the Mauna Loa observatory in Hawaii found that the levels of CO₂ are at least 34% higher than pre-Industrial Revolution levels and near the suspected climate-tipping point of 400 ppm. They note that the rise was 2.14 ppm in 2007, while from 1970 to 2000 the concentration rose by an average of about 1.5 ppm each year. “Present global mean CO₂, 385 ppm, is already in the dangerous zone” and “prompt policy changes” are needed, suggests the *Target Atmospheric CO₂: Where Should Humanity Aim?* paper by a group of scientists led by Jim Hansen, director of the NASA Goddard Institute for Space Studies. It concludes that, although the task of curbing man-made CO₂ emission is difficult, it is “feasible when compared with the efforts that went into World War II.” The meeting of the environment ministers from the Group of Eight industrialized nations held in Kobe, Japan, concluded with an agreement on the long-term goal of cutting greenhouse gas emissions in half by 2050, but without any specific emissions reduction targets for 2020. The report *From Bali to Poznan: New Issues, New Challenges* can be seen as background policy information for the next UNCCC to be held in Poznan, December 1-12, 2008.

Military Implications:

[Same as previous on similar issues] The military should document what it is doing to reduce its GHG emissions and what it could do next in anticipation of such requests from a new administration. Increasingly more compelling evidence and warnings on climate change amplify international discourse and increase the emergence of international policies trying to tackle the causes and develop strategies to mitigate climate change effects. Hence, the military should be doing its part in reducing greenhouse gas emissions and preparing to help mitigate the human-made and natural catastrophes that could ensue.

Sources: (see a more expanded list in the [Appendix](#))

Earth Impacts Linked to Human-Caused Climate Change

<http://www.giss.nasa.gov/research/news/20080514/>

Warming world altering thousands of natural systems

<http://www.nature.com/news/2008/080514/full/news.2008.823.html>

Greenhouse gases highest for 800,000 years

<http://in.reuters.com/article/environmentNews/idINL1440399320080514>

Response to cyclone in Myanmar ‘unacceptably slow’ – Ban Ki-moon

<http://www.un.org/apps/news/story.asp?NewsID=26634&Cr=myanmar&Cr1=>

Tornado season deadliest in a decade

http://www.usatoday.com/weather/storms/tornadoes/2008-05-12-tornado_N.htm?csp=DailyBriefing

Food Crisis Escapes Security Council Scrutiny

<http://www.asiantribune.com/?q=node/10984>

Secretary-General convenes inaugural meeting of food crisis task force

<http://www.un.org/apps/news/story.asp?NewsID=26632&Cr=food&Cr1=crisis>

Gene Giants Grab "Climate Genes"

http://www.etcgroup.org/en/materials/publications.html?pub_id=688

Global Warming Linked to Rainfall Decline in South-East Australia

<http://www.mdbc.gov.au/subs/seaci/SEACImedia-release-May08.pdf>

CU-Boulder Researchers Predict 59 Percent Chance Of Record Low Arctic Sea Ice In 2008

<http://www.colorado.edu/news/r/1fb96a0f5e60677e20ddafee67219e8d.html>

French-US satellite set for June launch to track sea levels

<http://afp.google.com/article/ALeqM5gv2lwkG8qxbEaQ-wL1FaeDj0RIxA>

They say they want a revolution

<http://www.nature.com/news/2008/080514/full/453268a.html>

Greenhouse gas hits record level

http://www.metro.co.uk/news/climatewatch/article.html?in_article_id=147343&in_page_id=59

Clock Running Out on Irreversible Climate Change – Part I

<http://yaleglobal.yale.edu/display.article?id=10657>

From Bali to Poznan: New Issues, New Challenges

<http://www.envirosecurity.org/activities/diplomacy/gfsp/climate>

8.10 Nanotechnology Safety Issues

New Study Raises Asbestos-type Health Worries for Nanotubes

According to a story in PhysOrg.com, “A major study ... in Nature Nanotechnology suggests some forms of carbon nanotubes ... could be as harmful as asbestos if inhaled in sufficient quantities.” Reporting experiments carried out on mouse tissue, one of the researchers, Prof.

Kenneth Donaldson of the University of Edinburgh, stated, “Long, thin carbon nanotubes showed the same effects as long, thin asbestos fibers”, causing pathological responses known to be precursors of mesothelioma. The scientists noted that it is still unknown if the tubes can be inhaled and reach sensitive portions of the lungs.

Petition to Stop Nano-silver-containing Products

A petition filed by a citizens’ coalition with the U.S. Environmental Protection Agency is demanding the agency exercise its pesticides’ regulating authority and stop the sale of about 260 products containing nano-silver, due to the compound’s possible risks to human health and the environment. The coalition of consumers, health, and environmental groups is led by the nanotech watchdog International Center for Technology Assessment.

Military Implications:

[Same as previous on this issue] Military personnel concerned with nanotech issues should contribute their views to these activities. Also, relevant military personnel should review the information generated by such activities to improve military and contractor practices, as well as to assist and cooperate with the organizations working on those issues for enriching their studies.

Sources:

Carbon nanotubes that look like asbestos, behave like asbestos

News story: <http://www.physorg.com/news130510729.html>

EPA Petitioned to Stop Sale of 260 Products Containing Nano-Silver

<http://www.ens-newswire.com/ens/may2008/2008-05-02-093.asp>

Item 9. Reports and Sources Suggested for Review

9.1 Twenty Years of Environmental Security

An Uncommon Peace: Environment, Development, and the Global Security Agenda by Geoffrey D. Dabelko, ECSP Director, published on the 20th anniversary of *Our Common Future* (commonly known as the Brundtland report) is an assessment of the evolution of our understanding of environmental concerns with implications for national and international security. It addresses changes in the traditional state-centered approach to new security threats such as: the possible environmental consequences of nuclear war replaced by the increased threat of dirty bombs; new threats such as genetic mutations; and health and poverty. Dabelko notes that these new realities outline the pathway to “one facet of our common future: environmental peacemaking.”

Military Implications:

The report is a comprehensive overview of 20 years of change and policies impacting global security, with useful insights for future security needs. It should be read by all who are tasked to plan future policy and actions.

Source:

An Uncommon Peace: Environment, Development, and the Global Security Agenda, by Geoffrey D. Dabelko

<http://www.heldref.org/env-dabelko.php>

9.2 Tools for Improving Water, Sanitation and Hygiene

A Review of Decision-Making Support Tools in the Water, Sanitation, and Hygiene Sector, a study directed by Peter H. Gleick at the Pacific Institute and by Geoffrey D. Dabelko at the Wilson Center's Environmental Change and Security Program, evaluates 120 existing resources in the sector, analyses the world's situation on access to water and sanitation, and assesses existing technologies and methodologies. The report recommends development of a set of tools to help decision-makers with infrastructure development, available technologies, and possible approaches. The tools would also outline specific needs of geographic locations, evaluate community particularities, and use case studies to demonstrate available technologies.

Military Implications:

The report is a good resource for those involved in resolving security issues related to water.

Source:

A Review of Decision-Making Support Tools in the Water, Sanitation, and Hygiene Sector
http://www.pacinst.org/reports/WASH_tool/index.htm

9.3 Improved Database for Stormwater Best Management Practices

Improvements in the International Stormwater BMP Database (www.bmpdatabase.org) were recently announced. They will ease BMP searches, data collection and uploading, and access to BMP performance analyses. The changes include more data, new data analysis results, easier Web site navigation, and simplified data entry.

Military Implications:

Military installations with responsibilities for management of stormwater and wastewater in the environment should become familiar with the new database, in order to evaluate their practices.

Sources:

Bigger and Better Stormwater BMP Database

http://www.enn.com/press_releases/2480

WERF website <http://www.werf.org//AM/Template.cfm?Section=Home>

APPENDIX

Reference Details

This Appendix contains expanded background information on some items.

Item 4. International Convention on Cluster Munitions Adopted by 111 Countries

Sources: (expanded list)

Dublin Diplomatic Conference, May 19-30, 2008

<http://www.clustermunitionsdublin.ie/>

Cluster Munitions: Convention a major step forward for the protection of civilians

<http://www.icrc.org/Web/Eng/siteeng0.nsf/html/cluster-munitions-news-290508>

Cluster Bomb Treaty Breaks New Ground

<http://hrw.org/english/docs/2008/05/30/18976.htm>

Cluster bomb ban treaty approved

<http://news.bbc.co.uk/2/hi/europe/7423714.stm>

Convention banning cluster bombs adopted

http://www.khaleejtimes.com/DisplayArticle.asp?xfile=data/theworld/2008/May/theworld_May1353.xml§ion=theworld

Norway: British support crucial to cluster bomb treaty

<http://www.iht.com/articles/ap/2008/05/30/europe/EU-GEN-Norway-Britain-Cluster-Bombs.php>

Ban 'delighted' at adoption of new cluster bomb convention

<http://www.un.org/apps/news/story.asp?NewsID=26859&Cr=cluster&Cr1=>

UN refugee agency welcomes adoption of pact to ban cluster bombs

<http://www.un.org/apps/news/story.asp?NewsID=26868&Cr=Cluster&Cr1=bomb>

Item 5. Indigenous Peoples Demand More Involvement in Environmental Policies

Sources: (expanded list)

Seventh Session of the United Nations Permanent Forum on Indigenous Issues

http://www.un.org/esa/socdev/unpfii/en/session_seventh.html

Climate Change: Indians Speak Out Against Carbon Markets

<http://www.ipsnews.net/news.asp?idnews=42259>

Climate change plea from tribe of herders who face extinction

<http://www.independent.co.uk/environment/climate-change-plea-from-tribe-of-herders-who-face-extinction-825424.html>

World's Native Peoples Take on Climate Change

<http://www.loe.org/shows/segments.htm?programID=08-P13-00019&segmentID=4>

Indigenous peoples have crucial role in climate change debate – UN forum

<http://www.un.org/apps/news/story.asp?NewsID=26565&Cr=indigenous&Cr1=>

Indigenous peoples most affected by climate change, Assembly President says

<http://www.un.org/apps/news/story.asp?NewsID=26531&Cr=indigenous&Cr1=>

Item 8. Updates on Previously Identified Issues

8.6 Arctic Issues Still at the Debate Stage

Sources: (expanded list)

The Ilulissat Declaration. Arctic Ocean Conference Ilulissat, Greenland, 27 – 29 May 2008

<http://www.um.dk/NR/rdonlyres/BE00B850-D278-4489-A6BE-6AE230415546/0/ArcticOceanConference.pdf>

Time for China and Saudi Arabia to start caring about the Arctic

http://www.newscientist.com/blog/environment/2008/05/time-for-china-and-saudi-arabia-to-muck.html?DCMP=ILC-hmts&nsref=spectr12_bar

Arctic declaration denounced as territorial 'carve up'

<http://www.guardian.co.uk/environment/2008/may/29/fossilfuels.poles>

Arctic states meet in Greenland. By Jan M. Olsen, The Associated Press

<http://cnews.canoe.ca/CNEWS/World/2008/05/28/5693696-ap.html>

Norwegian min says conf in Greenland will not carve up Arctic Ocean

<http://itar-tass.com/eng/level2.html?NewsID=12721839&PageNum=0>

Last-ditch bid to avert Arctic free-for-all

<http://www.independent.co.uk/environment/green-living/lastditch-bid-to-avert-arctic-freeforall-835200.html>

Reaching out in the Arctic

<http://en.rian.ru/analysis/20080514/107378393.html>

Russia complying with law in Arctic shelf claim – Ivanov

<http://en.rian.ru/russia/20080418/105419030.html>

8.9 Climate Change

More detailed descriptions of the items.

8.9.1 Scientific Evidence

A comprehensive study conducted by an international research team from 10 institutions around the world, led by NASA's Goddard Institute for Space Studies, found conclusive evidence of the link between human-caused climate change and the trends of change of Earth's natural systems. The research analyzed a database of more than 29,000 data series of physical and biological systems, and natural phenomena, on land and in water, with at least 20 years of records between 1970 and 2004. In about 90% of the cases from North America, Europe, and Asia, a link could be established between warming and changes of the systems' patterns or behavior. The results for Africa, South America, and Australia are not conclusive, due to lack of enough historical scientific data.

Scientists from Switzerland, France and Germany, working on the European Project for Ice Coring in Antarctica, found that "today's concentrations of carbon dioxide and methane are 28% and 124% higher respectively than at any time during the last 800,000 years," increasing the likelihood that human activity is a cause of climate change.

Chinese and Australian scientists are examining possibilities for deeper drilling in parts of Antarctica to find atmospheric records dating back 1.5 million years.

The Living Planet Index reveals dramatic biodiversity reduction since 1970: land species have declined by 25%, marine life by 28%, and freshwater species by 29%. Scientists estimate the current extinction rate being 10,000 times faster than the historical rate. The main causes of species decline are consequences of human behavior: climate change, pollution, destruction of animals' natural habitat, spread of invasive species, and overexploitation of species.

The Arctic is warming at about twice the global average and the changes of climate and moisture highly impact the region's vegetation, with possible negative consequences that will further influence global climate. The tundra is shrinking due to the expansion to the north of the boreal forests, which creates large dark surfaces that will absorb—instead of reflecting—solar heat. Reduced moisture increases wild fire potential in the tundra (in 2007, about 250,000 acres of Alaskan tundra burned), further improving the conditions for forest expansion. However, due to likely future drought in the region, the death of trees will be releasing carbon into the atmosphere instead of absorbing it, thus increasing greenhouse gas emissions.

8.9.2 Natural Disasters

Tens of thousands of people died and hundreds of thousands lost everything in Myanmar as tropical cyclone Nargis hit the Southeast Asian country, also known as Burma. The tragedy was increased by the lack of preparedness and response capability of the country and the ban on intervention by foreign aid agencies.

Although there is no consensus on linking storms' number and strength to climate change, some experts say that there is evidence of a probable trend that storms are becoming more powerful as global warming heats up the oceans. Professor Kerry Emanuel, an MIT meteorologist says that the power of tropical cyclones has roughly doubled since the 1950s, with the most increase occurring over the last three decades, consistent with man-made global warming.

Considering the rate so far, 2008 might be the year with the most tornadoes in the U.S. since 1950—when modern recordkeeping began—and the deadliest in a decade, reports The Weather Channel. In some states, the number to date of such storms already exceeds the yearly average: Mississippi had 49 tornadoes compared to an annual average of 39 twisters average; Alabama 45 versus 42, and Arkansas 49, compared to 48.

8.9.3 Food and Water Security

As the food crisis intensifies around the world over the past few months, an additional 100 million people began suffering from hunger and there were food riots in some 30 countries, including recently conflict-torn countries such as Haiti, Côte d'Ivoire, Senegal, and Somalia. Some argue that the Security Council should consider the issue in order to stop escalation into larger global security crises. "The Security Council would be remiss in carrying out its responsibility for maintaining peace and security if it fails to take the much needed preemptory steps to stop further deterioration of the security dimensions of the global food crisis," says Anwarul Karim Chowdhury, a former Bangladeshi ambassador and UN High Representative for Least Developed Countries (LDC). He compared the food crises to others—such as HIV/AIDS—that were discussed at the Security Council level and recalls that the bodies dealing with the food situation (ECOSOC and FAO) do not have security-related mandates.

Secretary-General Ban Ki-moon announced a new international UN Task Force on the Global Food Crisis, composed of the heads of key UN agencies and institutions, to prepare a comprehensive plan of action to tackle the global rise in food prices. The elements of the task force's plan will be presented at the UN and FAO High-Level Conference on World Food Security, Climate Change and Bioenergy to be held in Rome, June 3-5, 2008.

The International Planning Committee for Food Sovereignty suggests the creation of a UN Commission on Food Production, Consumption and Trade, as a more inclusive mechanism to replace the UN Task Force. It also advocates that the food emergency situation should override previous trade and international agreements and a new trade dialogue should begin under the auspices of the UN.

At this time, when food security threatens stability around the world, a few agricultural biotechnology companies are trying to concentrate corporate power, gain a monopoly over a large part of global food, undermine small farming and farmers rights, and most likely drive up costs. "Globally, the top 10 seed corporations already control 57% of commercial seed sales. This is a bid to capture as much of the rest of the market as possible," explains Hope Shand, Research Director of ETC Group. According to ETC Group's report, *Patenting "Climate Genes"...And Capturing the Climate Agenda*, Monsanto, BASF, DuPont, Syngenta, Bayer and Dow—along with some biotech partners—have filed 532 patent documents on genes related to environmental stress tolerance at patent offices around the world. In the meantime, poor countries complain that unfair policies are threatening their local seeds, undermining agricultural productivity and jeopardizing national food security. Some Indian farmers are giving up planting rice, because it is not cost-effective anymore, due to the high prices of fertilizer, seeds and pesticides.

Global warming is most probably the cause of changing rainfall patterns in Australia, concluded scientists gathered to discuss recent findings by the South-Eastern Australia Climate Initiative (SEACI). Assessing specifically the decline of rainfall and inflows into the Murray-Darling river systems over the past decade, SEACI, a three-year project that began in 2006, reveals that the Southeast Australian water system will most likely be increasingly stressed in the future as rainfall is expected to be significantly reduced, concomitantly with suspected warmer temperatures. Dr Wendy Craik, chief executive of the Murray-Darling Basin Commission, notes that in some parts of the basin the drought is more severe than the worst climate change predictions for 2055. Since future prospects are not encouraging, drought-adaptation strategies should be considered.

8.9.4 Melting Glaciers and Sea Ice

Arctic sea ice has declined by about 10% in the past decade, note scientists from the University of Colorado's Center for Astrodynamics Research. They estimate that there is a 59% chance that this year in September the ice cover will reach a new record low, as currently the ice is thinner and younger than at any time since observations have been recorded. In September 2007, the extent of Arctic sea ice was the smallest on record.

Scientists are increasingly confident that human activity is the cause of the new weather patterns seen at both poles. Their findings are based on computer models that analyzed natural and human-caused variables, and were compared with the observed real conditions. The models revealed an ice-free Arctic by 2030—about two decades ahead of the predictions in the United Nations' Intergovernmental Panel on Climate Change reports.

8.9.5 Rising Sea Levels

Six of the 18 inhabited low-lying Australian Torres islands have little or no elevation and are in danger of being swallowed by the sea. The islanders are already suffering because of abnormally high tides, land erosion, shifting seasons, and increasingly scarce marine life that traditionally constitutes their food source. Aborigines and Torres Strait islanders regained ownership of their traditional lands in 1992. Already socially and economically marginalized, the roughly 7,000 people are unhappy with the lack of attention and care on the part of the Australian government.

The Ocean Surface Topography Mission (OSTM)/Jason 2 mission to be launched in June will provide data for better understanding ocean currents and the rises in sea levels. Current marine measurements show that sea levels have risen on average by 0.3 centimeters since 1993, twice that, in the whole 20th century. The Jason 2 mission is a partnership between NASA, the National Oceanic and Atmospheric Administration, the French National Center of Space Studies (CNES), and the European satellite agency EUMETSAT.

8.9.6 Computer Modeling

Climate scientists and modelers warn that climate change forecasting abilities are still relatively weak and that some of those considered in policymaking—such as the IPCC assessments—are highly debatable, being too conservative and not taking into account the latest research.

Climate modelers from around the world met at the World Modelling Summit for Climate Prediction, held in Reading (UK), May 6-9, 2008, to try to improve forecasting abilities, including measures that will allow a better understanding of how the climate will be affected locally as well as globally. At the end of the four-day summit, scientists made the case for a climate-prediction project on the scale of the Human Genome Project. A key component of this scheme would be a world climate research facility with computer power far beyond that currently used in the field.

8.9.7 Post-Kyoto Negotiations

Scientists at the Mauna Loa observatory in Hawaii found that the levels of CO₂ are at least 34% higher than pre-Industrial Revolution levels and near the suspected climate-tipping point of 400 ppm. They note that the rise was 2.14 ppm in 2007, while from 1970 to 2000 the concentration rose by an average of about 1.5 ppm each year.

“Present global mean CO₂, 385 ppm, is already in the dangerous zone” and “prompt policy changes” are needed, suggests the *Target Atmospheric CO₂: Where Should Humanity Aim?* paper by a group of scientists led by Jim Hansen, director of the NASA Goddard Institute for Space Studies. Based on an analysis of paleoclimate data and ongoing climate change, the authors argue that CO₂ should be reduced to a maximum of 350 ppm in order to avoid reaching irreversible tipping points and maintain the Earth conditions supporting life as we know it. The main policy suggestions include increasing efforts to find energy sources beyond fossil fuels, and ending fossil fuel exploitation and use without adequate CO₂ capture and sequestration. The ultimate task is phaseout over the next 20-25 years of coal plants that are not equipped with carbon sequestration technology. The paper admits that establishing a clear time frame of climate change is difficult, since the models are still deficient. Nevertheless, it underlines the urgency of the situation and concludes that although the task of curbing man-made CO₂ emission is difficult, it is “feasible when compared with the efforts that went into World War II.”

The meeting of the environment ministers from the Group of Eight industrialized nations held in Kobe, Japan, concluded with an agreement on the long-term goal of cutting greenhouse gas emissions in half by 2050, but without any specific emissions reduction targets for 2020.

The *State and Trends of the Carbon Market 2008* report of the World Bank shows that the global carbon market grew to \$64 billion in 2007, more than double the 2006 level. The European Union Emission Trading Scheme (EU ETS) also saw a doubling of both value and number of allowances transacted.

The report *From Bali to Poznan: New Issues, New Challenges* summarizes the discussions and outcomes of the conference with the same name held at the European Parliament in Brussels, December 18, 2007, convened by the Institute for Environmental Security in cooperation with other interested organizations. It assesses the impact of climate change on international security and sustainable development, a switch to solar energy as an alternative to fossil fuels, implications of illegal trade in natural resources, and the ways climate change influences European foreign policy. The report can be seen as background policy information for the next UNCCC to be held in Poznan in December 1-12, 2008.

Sources: (expanded list)

Earth Impacts Linked to Human-Caused Climate Change

<http://www.giss.nasa.gov/research/news/20080514/>

Attributing physical and biological impacts to anthropogenic climate change. *Nature*, 453, 353-357, doi:10.1038/nature06937

http://pubs.giss.nasa.gov/abstracts/2008/Rosenzweig_etal_1.html (article by subscription only; graphs http://www.nature.com/nature/journal/v453/n7193/fig_tab/nature06937_F2.html#figure-title)

Warming world altering thousands of natural systems

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Greenhouse gases highest for 800,000 years

<http://in.reuters.com/article/environmentNews/idINL1440399320080514>

An epidemic of extinctions: Decimation of life on earth

<http://www.independent.co.uk/environment/nature/an-epidemic-of-extinctions-decimation-of-life-on-earth-829325.html>

Boreal forests shift north

http://www.sciencenews.org/view/generic/id/32207/title/Boreal_forests_shift_north

Cyclone death toll nears 4,000 in Myanmar, state radio says

http://enews.earthlink.net/article/top?guid=20080505/481e8640_3ca6_15526200805051277004416

Response to cyclone in Myanmar ‘unacceptably slow’ – Ban Ki-moon

<http://www.un.org/apps/news/story.asp?NewsID=26634&Cr=myanmar&Cr1=>

Climate link with killer cyclones spurs fierce scientific debate

http://afp.google.com/article/ALeqM5hmntRFM_YGeh_Ar7T2AK2uQF7FIQ

Tornado season deadliest in a decade

http://www.usatoday.com/weather/storms/tornadoes/2008-05-12-tornado_N.htm?csp=DailyBriefing

Food Crisis Escapes Security Council Scrutiny

<http://www.asiantribune.com/?q=node/10984>

United Nations Sustainable Development Commission Set To Tackle Issues Underpinning Global Food Crisis, At Headquarters, 5-16 May

<http://www.un.org/News/Press/docs//2008/envdev974.doc.htm>

Secretary-General convenes inaugural meeting of food crisis task force

<http://www.un.org/apps/news/story.asp?NewsID=26632&Cr=food&Cr1=crisis>

Task Force on global food crisis to move at 'full speed' – Ban Ki-moon

<http://www.un.org/apps/news/story.asp?NewsID=26562&Cr=food&Cr1=crisis>

High-Level Conference on World Food Security: the Challenges of Climate Change and Bioenergy – Rome, FAO, 3-5 June

<http://www.fao.org/newsroom/>

Firms Seek Patents on 'Climate Ready' Altered Crops

<http://www.washingtonpost.com/wp-dyn/content/article/2008/05/12/AR2008051202919.html>

Patenting the "Climate Genes"...And Capturing the Climate Agenda

http://www.etcgroup.org/upload/publication/pdf_file/687

Gene Giants Grab "Climate Genes"

http://www.etcgroup.org/en/materials/publications.html?pub_id=688

India's Rice Farmers Abandon Paddies, Deepening Global Shortage

<http://www.bloomberg.com/apps/news?pid=20601091&sid=aKifVN0bmi9E&refer=india>

Global Warming Linked to Rainfall Decline in South-East Australia

<http://www.mdbc.gov.au/subs/seaci/SEACImedia-release-May08.pdf>

Murray-Darling woes linked to global warming: report

<http://www.abc.net.au/news/stories/2008/05/02/2233524.htm>

Experts warn of never-ending drought

<http://www.theage.com.au/news/national/drought-may-never-end/2008/05/09/1210131244721.html>

Civil Society statement on the World Food Emergency. No More "Failures-as-Usual"!

<http://www.nyeleni.eu/foodemergency/CSOdraftStatement-English.pdf>

CU-Boulder Researchers Predict 59 Percent Chance Of Record Low Arctic Sea Ice In 2008

<http://www.colorado.edu/news/r/1fb96a0f5e60677e20ddafee67219e8d.html>

Arctic on thin ice this fall

<http://www.rockymountainnews.com/news/2008/apr/30/arctic-thin-ice-fall/>

Climate at Both Earth's Poles Shows Clear Human Influence

<http://www.thedailygreen.com/environmental-news/latest/arctic-antarctic-climate-47050204>

Dramatic evidence of the break-up of the Arctic ice-cap has emerged from research during an expedition by the Canadian military.

<http://news.bbc.co.uk/2/hi/science/nature/7417123.stm>

Sinking without trace: Australia's climate change victims

<http://www.independent.co.uk/environment/climate-change/sinking-without-trace-australias-climate-change-victims-821136.html>

French-US satellite set for June launch to track sea levels

<http://afp.google.com/article/ALeqM5gv2lwkG8qxbEaQ-wL1FaeDj0RIxA>

Poor forecasting undermines climate debate

<http://environment.newscientist.com/channel/earth/mg19826543.700-poor-forecasting-undermines-climate-debate.html> (by subscription only; full text [below](#))

They say they want a revolution

<http://www.nature.com/news/2008/080514/full/453268a.html>

World Modelling Summit for Climate Prediction, 6 to 9 May 2008

<http://www.ecmwf.int/newsevents/meetings/workshops/2008/ModellingSummit/presentations/index.html>

Greenhouse gas hits record level

http://www.metro.co.uk/news/climatewatch/article.html?in_article_id=147343&in_page_id=59

NOAA ESRL 2008 Global Monitoring Annual Conference

<http://www.esrl.noaa.gov/gmd/annualconference/>

Target Atmospheric CO₂: Where Should Humanity Aim?

<http://arxiv.org/ftp/arxiv/papers/0804/0804.1126.pdf>

Clock Running Out on Irreversible Climate Change – Part I

<http://yaleglobal.yale.edu/display.article?id=10657>

G8 Environment Ministers Agree on 2050 Climate Goal

<http://www.ens-newswire.com/ens/may2008/2008-05-27-04.asp>

State and Trends of the Carbon Market 2008

<http://world-wire.com/news/0805070001.html>

From Bali to Poznan: New Issues, New Challenges

<http://www.envirosecurity.org/activities/diplomacy/gfsp/climate>

Poor forecasting undermines climate debate

By Fred Pearce

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"POLITICIANS seem to think that the science is a done deal," says Tim Palmer. "I don't want to undermine the IPCC, but the forecasts, especially for regional climate change, are immensely uncertain."

Palmer is a leading climate modeller at the European Centre for Medium-Range Weather Forecasts in Reading, UK, and he does not doubt that the Intergovernmental Panel on Climate Change (IPCC) has done a good job alerting the world to the problem of global climate change. But he and his fellow climate scientists are acutely aware that the IPCC's predictions of how the global change will affect local climates are little more than guesswork. They fear that if the IPCC's predictions turn out to be wrong, it will provoke a crisis in confidence that undermines the whole climate change debate.

On top of this, some climate scientists believe that even the IPCC's global forecasts leave much to be desired. In particular, they say that because the IPCC cannot take the most recent research into account, its predictions are too conservative.

Next week, climate modellers from around the world will meet in Reading at the World Modelling Summit for Climate Prediction, held under the auspices of the UN, to try to improve our forecasting abilities. Its declared aim is to "prepare a blueprint to launch a revolution in

climate prediction", including measures that will allow us to predict how the climate will be affected locally as well as globally.

The organisers say that this will require the computing power brought to bear on the problem to be increased "by a factor of 1000". One option likely to be discussed is the creation of a global climate modelling centre - a climatological equivalent of international collaborations like the CERN particle physics centre in Europe.

Meanwhile representatives of the world's nations were meeting in Bangkok, Thailand, last month, to begin detailed work on a treaty to replace the Kyoto protocol in 2013. They will be basing their discussions on the best predictions available from the IPCC, which means that by the time this son-of-Kyoto is in force, the science on which it is based will be eight years old.

European governments are pressing for an agreement that would keep atmospheric concentration of carbon dioxide below 450 parts per million. This compares with pre-industrial levels of 280 ppm and current levels of 380 ppm. This, they argue, will prevent warming by more than 2 °C, and so avoid "dangerous" climate change.

Yet many climate scientists wince at this. First, because the European governments like to claim that the IPCC backs these targets, when in fact the IPCC goes out of its way to say that setting targets is a job for politicians. And second, because nobody knows either whether 450 ppm will hold warming below 2 °C, or whether this amount of warming will turn out to be safe. "It's horrifying when you see things boiled down to simple terms like a 2 °C warming. That will mean hugely different things for different places," Palmer says.

One reason the IPCC's official reports are slow to bridge this gap is the panel's policy of only considering published peer-reviewed research that is available when its review process gets under way. This means the current report, published last year, takes no account of research published after early 2005.

An increasingly scary debate about the state of the Greenland ice sheet is almost entirely absent in the 2007 report, for instance (see "What if the ice goes?"). Other recent research suggests that warming may be accelerating beyond IPCC predictions: first, because higher temperatures are releasing greenhouse gases from forests, soils and permafrost; and second, because the ocean's ability to absorb CO₂ seems to have declined in the past decade.

Equally worrying is the fact that climatologists are losing confidence in the ability of existing models to work out what global warming will do to atmospheric circulation - and hence to local weather patterns like rainfall. The most recent IPCC report made a number of regional predictions. It felt able to do so because it was generally assumed that if most models agreed on future climate in, say, the Amazon rainforest or western Europe, then they were probably right.

Palmer disputes this. In a paper in the April edition of the *Bulletin of the American Meteorological Society* he warns that models often share the same biases and blind spots about features of the climate system that are critical for regional forecasts. They cannot reproduce El Niños in the Pacific Ocean, for instance. Nor can they simulate the weather systems that bring

drought to the Sahel region of Africa, or the Atlantic storm tracks and blocking high-pressure zones that determine whether western Europe is wet or dry.

Last year, a panel on climate modelling that was preparing the ground for next week's summit concluded that current models "have serious limitations" and that their uncertainties "compromise the goal of providing society with reliable predictions of regional climate change". The panel, chaired by Jagadish Shukla of George Mason University in Claverton, Maryland, dismissed many current regional predictions as "laughable".

But whatever the uncertainties at the local level, the big picture remains clear. Our planet is straying into unknown climatic territory, with consequences that we probably have to accept are almost impossible to predict.

One of these unknowns was highlighted last month in the preprint of a paper James Hansen of the NASA Goddard Institute for Space Studies has submitted to the journal *Science* (www.arxiv.org/abs/0804.1126). Looking back 50 million years, to a time when falling CO₂ levels in the atmosphere reached 425 ppm - a level we are likely to reach within two decades - he says that was the moment Antarctica got its ice cap. This suggests that the planet may have a tipping point at around that level, give or take 75 ppm, and that by going above it we could render Antarctica ice-free once again. That would raise sea levels by around 60 metres.

Hansen concludes that far from aiming to limit rising CO₂ concentrations to a ceiling of 450 ppm, as currently suggested, the world should set a long-term target of getting back down to 350 ppm. A few decades with CO₂ above that figure might not matter, but "it would be foolish to allow CO₂ to stay in the danger zone for centuries," he says. "If the present overshoot of this target CO₂ is not brief, there is a possibility of seeding irreversible catastrophic effects."

These developments in climate research raise fears that the IPCC will be left stranded, too distant from the cutting edge of research to be of much use in guiding action over climate change. Some researchers now argue that it should produce more regular, up-to-date reviews of climate science, but at a meeting in Budapest in early April the panel decided to stick with its current policy. Its next full assessment is due in 2013 or 2014. Who knows where the world will be by then?

Climate Change - Want to know more about global warming: the science, impacts and political debate? Visit our continually updated special report.

What if the ice goes?

For hundreds of millions of people living near the world's coastlines, a rise in sea level is the biggest danger posed by climate change. Last year's IPCC report puts the likely rise in the coming century at between 18 and 59 centimetres, and most countries are basing their decisions on climate policy on that assumption. But it could be much more.

Even as the IPCC report was being finalised, new research showed sea levels were rising 50 per cent faster than the report assumed. And new modelling presented last month at the conference of the European Geosciences Union in Vienna, Austria, by Svetlana Jevrejeva of the Proudman

Oceanographic Laboratory in Liverpool, UK, predicted the rise in the 21st century would be three times the IPCC prediction, at up to 1.5 metres. The new element here is the discovery that as the atmosphere warms, the ice sheets on Greenland and West Antarctica may not melt gradually as had been predicted. Instead, they may break up rapidly as meltwater penetrates the ice.

Researchers at the Woods Hole Oceanographic Institution in Massachusetts reported last month that they had watched a lake in Greenland 3 kilometres across empty down a kilometre-deep crack in the ice within 90 minutes - a discharge that, they said, "exceeded the flow of Niagara Falls". The possibility that such events could cause the break-up of the Greenland ice sheet is an increasingly controversial topic among glaciologists. Not all believe even large numbers of "Greenland Niagaras" would destabilise the entire sheet, but the possibility remains that it could disappear, which would raise sea levels by 6 metres.

Meanwhile the old certainties of gradual melting over thousands of years remain in the IPCC report. It is doubtful whether they still hold water.